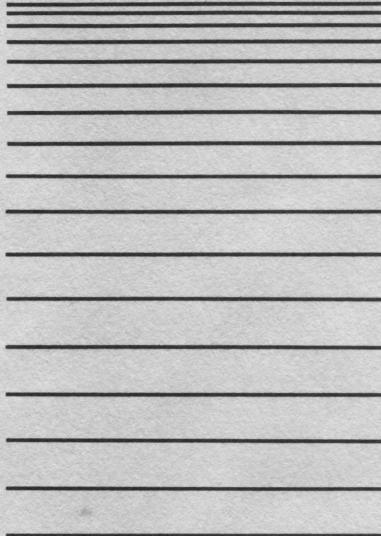


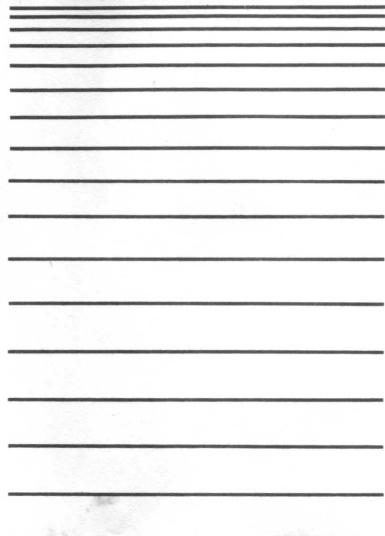
Cluster/One, Model A System Manager's Manual

NESTAR



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NESTAR SYSTEMS, INCORPORATED

CLUSTER/ONE MODEL A (TM) Version 1.0

SYSTEM MANAGER'S MANUAL

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How to Use This Manual

This is Release One of the Cluster/One Model A System Manager's Manual. It is designed for experienced programmers who know the Apple DOS and Pascal programming systems, and who are familiar with the 6502 processor and Apple I/O hardware. This manual assumes you have a working knowledge of the Nestar Cluster/One Model A system and that you understand the accompanying User's Manual. The objectives of this manual are two-fold: i.) to help you bring up the Nestar System for the first time, and ii.) to act as a reference manual for maintaining your Cluster/One.

The basic organization of this manual is as follows. Chapter 1 gives an overview of the Nestar System. Chapters 2 and 3 on Hardware and Software Installation are intended as a tutorial for simply booting the system. Chapter 5 examines more fully the subject of setting up your system and user disks, and explains the operation of the system console. If this is your first Cluster/One it we suggest that you read chapters 1 through 3 and 5 in succession and follow the directions therein.

For more experienced Cluster/One users, chapters 4-6 are intended for reference purposes. Chapter 4 lists some software modifications you can perform on-site to tailor the system to your own needs. In addition to the above, Chapter 5 gives complete command descriptions for all the privileged system console commands. Chapter 6 explains how to run the Nestar Disk Utility programs provided with your system.

We welcome criticisms and suggestions. Forms for reporting program bugs and documentation inadequacies are included near the back of this manual.

This is the Model A . . . the first of its kind.

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Chapter 1

Introduction

The Cluster/One Model A system, developed by Nestar Systems, Inc. of Palo Alto, California, is based on a multiple access local computer network. The network transmits data among communicating stations, which may be hooked together in any desired topology. Each Apple station on the network has a Network Interface Card in one of its peripheral slots.

There are two basic types of stations on the network: user stations and server stations. User stations are stand alone computing facilities except that they may access shared resources via the network. Server stations provide a service to the user stations: sharing a peripheral device such as a disk or printer, delivering mail, gathering statistics, etc.

The Cluster/One system provides a sophisticated central file server station called the 'Nestar File Server' or NFS. NFS is responsible for managing virtual files for the user stations. NFS runs on a standard Apple Pascal system, and is written in Pascal and 6502 assembler. The purpose of this manual is to detail the installation and maintenance of the Nestar File Server.

Chapter 2

Hardware Installation

The procedure listed below should be used in configuring your Cluster/One system hardware. Follow each step carefully, and if you have difficulties please call Nestar Systems.

2.1 Identifying User Station and Nestar File Server Network Interface Cards

The user station Network Interface Cards are indentified by the code 'A1.0' on the large EPROM on each card. The EPROM chip is easily recognized as it is the only chip with a square translucent or transparent window on the top of it. There is one similar card, which is used in the Nestar File Server, but it has a EPROM identified as 'B1.0'. This card must have the address \$FE (see Section 2.2) at all times. (It also may be recognized by the resistor pack which is installed in the socket just above the (C) 1980 legend in the lower right hand corner of the card. This resistor pack is NOT present on the user station cards.)

2.2 Addressing Network Interface Cards

Each station must have a unique address programmed on the address shunts. When holding the card in your hand with the network cable connectors in the upper right hand corner the shunts are read as follows:

| bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|------------------|---|---|---|---|---|---|---|-------------------|
| most significant | | | | | | | | least significant |

where bit 0 is closest to the white pin 0 mark on the board. A broken shunt signifies a binary digit zero and a closed shunt signifies a binary digit one. All user station cards are distributed with shunt seven broken and therefore are address \$7F (the '\$' signifies hexadecimal). Addresses from 1 to \$7F are available for use. All other addresses are reserved for standard Nestar Subsystems.

Addresses are programmed by breaking the shunts where a zero is desired by using a small sharp tool. For example, if shunts 2,4 and 5 are broken on a user station card its address would be \$4B (hex) or 75 (decimal).

2.3 Installing Network Interface Cards

All user stations should have a Network Interface Card plugged in. The card may be used in any slot in the Apple

HARDWARE

user station except slot zero. We highly recommend that the card be placed in slot 6 for the purpose of standardization and ease of use with Apple Pascal.

The Network Interface Card in the Nestar File Server MUST be in slot 6, and will NOT function properly if used in a different slot.

In addition, NFS's floppy disk controller card must be installed in slot 4. The cable from the controller card to the floppy disk cabinet is installed with the red stripe DOWN. If a hard disk is present, the hard disk controller card goes in slot 2. The hard disk controller and cable come attached to the hard disk cabinet and should not be changed. If for some reason they become separated, the connector attaches to the card so that the side with the ribbon cable coming out of it faces down, with the red stripe towards the back of the Apple.

The Apple II selected for use as the Nestar File Server must be ultra-reliable: its RAM chips must be good and the Language Card used with it must be operational. You should ensure the operational soundness of this Apple by exercising it extensively under Apple Pascal.

NOTE: You should NOT use an Apple II with a revision 0 motherboard on the Nestar system as either a user station or the central file server, as it does not have a power-on reset, and may hang up the Nestar network.

2.4 Connecting the Network Together

Any network topology may be used in cabling the stations together. Typical configurations include a single line, an 'E' shape, a ring, etc. The total length of a single network must not exceed 1000 feet. If flat ribbon cable is used for the network then it is installed with the red stripe UP everywhere (note that this is the opposite of the way the floppy disk controller cable is installed).

Due to the presence of two 16-pin headers on each card, it is possible to have the Nestar File Server in the middle of a string of user stations or at one end, as follows:

(user)==(user)==(user)==(user)==(Nestar File Server)

or

(user)==(user)==(Nestar File Server)==(user)==(user)

Chapter 3

Software Installation3.1 Installation Requirements

Some knowledge of the Apple Pascal and DOS operating systems is required to install the Nestar system; in particular, knowledge of the various system commands and use of the keyboard. Detailed knowledge of Pascal language programming techniques is not necessary. Please refer to the Apple DOS 3.2.1 Reference Manual and the Apple Pascal Reference Manual for any questions you might have on the operation of these systems.

The Apple II to be used as the Nestar File Server should be set up initially with one standard Apple II Pascal Disk controller in slot 6 and the Nestar floppy disk controller in slot 4. (The optional Nestar hard disk controller card is not used at this time, and should not be installed yet.)

NOTE: At NO time should the Nestar File Server be run with a serial or communications card (or various 80-column cards which emulate these peripherals) in any slot, or with any other cards than those supplied by Nestar (with the exception of the required Language Card in slot 0).

3.2 Contents of the Nestar Distributed Diskettes

The Nestar system is shipped with:

--One 5 1/4" floppy disk in Pascal format, write-protected and externally labelled 'INSTALL' (Version 1.0) containing the Pascal program INSTALL and associated data files, used for installing Apple Pascal on the Nestar system.

--Two double-sided 8" Nestar format floppy disks which are identical, except that one is write-protected and externally labelled 'MAIN (ARCHIVE Version 1.0)', and the non-write-protected disk is externally labelled 'MAIN (BOOT Version 1.0)'. ARCHIVE is simply a copy of the system disk MAIN, and should not be used except in case of disaster. MAIN contains the following directory structure:

SOFTWARE

```
/main /boot  
/pascal /boot  
/system /errors  
    /help /create  
    /mount  
    /pathname  
    ...  
/dos  /3.2.1
```

/MAIN/BOOT is a binary virtual diskette that contains the network BOOT program that is described in Appendix B of the User's Manual, and in Section 4.1 of this manual.

/MAIN/PASCAL/BOOT is the disk the Nestar File Server boots from, and contains:

CMD.CODE is a program that transmits Cluster Commands to the Nestar File Server.

NETUNIT.LIBRARY which contains SENDMSG and NETTALK which is the Pascal and assembly language parts of a Unit used to send Cluster Commands to the file server from a Pascal program.

THIRD.BOOT is the third bootstrap used for bringing up Pascal for the Nestar File Server.

SYSTEM.STARTUP is the program that is run when you boot the Nestar File Server and uses the data file ARITH.CODE.

FORMAT.CODE, DISKCOPY.CODE, FILTRAN.CODE, FILDEBUG.CODE are the four Nestar disk utilities used to maintain the file system.

NFS.CODE is the Nestar File Server program.

/MAIN/PASCAL/SYSTEM is a directory containing ERRORS - the text for all the error messages, and HELP - a directory of files containing the text for the HELP command.

/MAIN/DOS/3.2.1 is a bootable Apple DQS Master virtual diskette containing the NESTAR DISK COPY utility program for Apple DOS users. The program is described in Appendix C of the User's Manual.

You will need two double-headed, single density, soft-sectored 8" floppy disks during the installation procedure in order to back up the Nestar distributed floppy disks.

3.3 Installation Procedure

The goal of the rather lengthy procedure presented below is to combine the standard Pascal system as distributed by Apple with the file server software distributed by Nestar. The end result will be a diskette from which the Nestar File System can be booted quickly and easily.

To begin, check that the proper disk controllers are in slots 4 and 6 of the Apple (see Section 3.2), and turn on the Nestar floppy disk unit. Place the Apple distributed minidisk labelled APPLE1: in minidisk drive #1, and boot the Pascal system by simply turning on the power.

When you see:

```
WELCOME APPLE1:  
TO U.C.S.D. PASCAL SYSTEM II.1  
CURRENT DATE IS . . .
```

on the screen, remove the APPLE1: disk, and set it aside momentarily. Insert the disk labelled INSTALL: in its place.

3.3.1 Executing INSTALL

Next press the X (for X(ecute) key, and reply to the prompt:

EXECUTE WHAT FILE?

with the input 'INSTALL:INSTALL'. You will now see the message:

```
INSERT BOOT: IN CLUSTER DRIVE #1  
TYPE <SPACE> TO CONTINUE, <ESC> TO ABORT.
```

Insert the 8" disk labelled MAIN (Boot Version 1.0) in the left hand Nestar drive, then press space. Make sure you have inserted the disk which is not write-protected in the drive. It does NOT have a notch cut out near its corner, whereas ARCHIVE does.

Provided everything has gone well thus far, you will now see the message:

```
INSERT APPLE1: IN APPLE DRIVE #1  
TYPE <SPACE> TO CONTINUE, <ESC> TO ABORT.
```

Do as instructed, and then press <space>.

The system will now display the messages:

SOFTWARE

COPYING SYSTEM.APPLE
COPYING SYSTEM.PASCAL
COPYING SYSTEM.MISCINFO

on the screen one at a time with a series of dots displayed between them as it proceeds with the copying process. Any error messages mean the process has aborted for some reason.

Next, the system will display:

INSERT INSTALL: INTO APPLE DRIVE #1
TYPE <SPACE> TO CONTINUE, <ESC> TO ABORT.

Do as instructed, INSTALL will access the disk then display:

INSERT APPLE1: INTO APPLE DRIVE #1
TYPE <SPACE> TO CONTINUE, <ESC> TO ABORT.

Again, do as instructed, and you should return to the command level of Pascal. If you are still of sound mind and body, fundamental software installation is complete.

3.3.2 What to Do if INSTALL Gives You an Error

If at any time during the execution of INSTALL:INSTALL you receive a non-fatal error, a message will appear on your screen along with the phrase:

error message
TYPE <SPACE> TO CONTINUE, <ESC> TO ABORT

Copy down the error message and error number (if given). Next, attempt to remedy the situation by checking:

1. the disk has been inserted correctly
2. the disk is in good condition
3. the cables between the disk controller cards and the disk drive units are connected properly
4. whatever else you can think of

Then type <space> to continue. If after repeated tries, you are still receiving error messages give us a call at Nestar, making sure to relate the exact sequence of events and the error messages and numbers that were displayed on your screen. If a fatal error occurs, the following message will be printed

FATAL ERROR: error message
CONTACT NESTAR FOR ASSISTANCE

Do as instructed before proceeding further.

3.3.3 Booting the System for the First Time

Remove and put in a secure place the two write-protected disks ARCHIVE and INSTALL which were shipped with the system. They should not be needed any longer.

Next turn off the power to the Apple, and remove the minidisk controller card from slot 6. Now place the Nestar File Server Network Interface Card in slot 6 (see Section 2.1). If you have the hard disk option, the hard disk controller card should be inserted into slot 2. With the disk you created above -MAIN (Boot Version 1.0)- inserted in Cluster disk drive #1, power on the Apple. It should boot Pascal, and display:

```
COMMAND: E(DIT, R(UN, F(ILE, C(OMP, L(IN
*****
*** NESTAR CLUSTER/ONE MODEL A ***
***          VERSION 1.0      ***
*****
```

Copyright 1980,
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on the screen.

Prior to executing the Nestar File Server, you should format two double-headed 8" floppy disks, to be used as back up copies of the disk you have just created. To format new disks, follow the instructions for FORMAT in Section 6.1 of this manual. Give these disks the volume id SCRATCH.

Next follow the instructions for DISKCOPY in Section 6.2, and make a copy of MAIN (Boot Version 1.0) onto each of the disks you have just formatted, also giving them the name MAIN. These are your backup copies in case of emergency or disk wear.

NOTE: If you have the hard disk option, make one more copy of MAIN (Boot Version 1.0) floppy disk onto unit 5, the hard disk. You must use FILTRAN (see Section 6.3.3) to do this, specifying /1 as the source directory, and /5 as the target directory. Since you want to be able to boot from the hard disk, respond 'Y' when FILTRAN asks you whether /MAIN/PASCAL/BOOT should be identified as the boot virtual diskette of the destination disk.

After this step is completed, remove any floppy disks from the Nestar drives, and power off the Apple. Powering it back on will cause the system to boot from the hard disk.

SOFTWARE

After you have completed your backups, you may execute the Nestar File Server by following the directions given in Section 5.1. You will need to do this prior to setting up user disks.

3.4 Setting Up User Directories and Disks

There are two environments in which user disks must be established: Apple DOS and Apple Pascal. We suggest a directory structure similar to the one pictured below. Following the diagram is a general explanation of how to set up your system.

```
/main /boot
      /system /errors
          /help /create
          /mount
          ...
/pascal /lib
      /boot
/users /fred /1
      /2
      /ethel /stuff
          /doc
          /lucy
/utils /dos
      /pascal
/source /dos
      /pascal /1
      /2
```

3.4.1 Setting Up Disks under DOS

DOS users can boot the disk called /MAIN/DOS/3.2.1 which is distributed with the system, and then use the commands CREATE, MOUNT etc. along with NESTAR DISK COPY (see User's Manual) to copy any minidisks onto the system. Other than creating special disks for DOS users, and establishing a workable file system hierarchy, there are no other procedures to follow. See below regarding the building of PASCAL/LIB, which is accessed on behalf of DOS stations which have Language Cards.

3.4.2 Setting Up Disks under Pascal

Before any Pascal users run the system, you should boot /MAIN/PASCAL/BOOT from a user station, with an Apple disk controller in slot 5, so that you can read and copy in the other Apple distributed portions of the Pascal system onto a new library virtual diskette called PASCAL/LIB (described below). The disk /MAIN/PASCAL/BOOT has no public read access rights, and the password NESTAR must be supplied in

order to boot, i.e. /MAIN/PASCAL/BOOT:NESTAR. (The other files distributed with the system have public read access, but other rights are permitted only with the NESTAR password. You should change this password to something else using the PROTECT command.)

3.4.2.1 Creating /MAIN/PASCAL/LIB

/MAIN/PASCAL/LIB (hereafter abbreviated to PASCAL/LIB) is the virtual diskette the BOOT program (see Appendix B of the User's Manual) uses: i.) to locate INTBAS.DATA (Integer BASIC) and FPBAS.DATA (Floating Point BASIC) for DOS users with Language Cards, and ii.) for MOUNTing on drive #5 as a library disk for Pascal users.

The procedure by which you create PASCAL/LIB is listed below in great detail. If you are familiar with the Pascal and Nestar systems you may skim the directions for the underlined phrases. Prior to starting this procedure you must start up the Nestar File Server according to the directions given in Section 5.1.

1. Boot /MAIN/PASCAL/BOOT:NESTAR at a user station by turning on the power and answering the prompt:

VOLUME TO BOOT:

with '/MAIN/PASCAL/BOOT:NESTAR'.

2. From the command level of Pascal execute CMD by typing 'X'. The system will respond by saying:

EXECUTE WHAT FILE?

Type 'CMD' and press <return>.

3. CMD will display its copyright notice followed by its prompt ":". Create PASCAL/LIB by typing:

CREATE /MAIN/PASCAL/LIB,T=P,SIZE=x

where x is the number of blocks you want on the disk. We suggest you allocate approximately 1000. CMD should respond with OK.

4. Mount PASCAL/LIB by entering:

MOUNT /MAIN/PASCAL/LIB,D9,RW

CMD should respond with OK.

SOFTWARE

5. Type <return> to exit CMD.
6. Go into the Pascal Filer by typing 'F'.
7. Zero PASCAL/LIB's directory by typing 'Z'. The filer will respond with:

ZERO DIR OF WHAT VOL ?

Respond with '#9:'. The filer will ask:

DUPLICATE DIR ?

Since Apple Pascal does not support this feature type 'N'. Next, it will ask:

HOW MANY BLKS ON THE DISK ?

Enter whatever number you used for SIZE=x when you created PASCAL/LIB. Then it will ask:

NEW VOL NAME ?

We suggest you name the volume PASCAL:. So type 'PASCAL' and <return>. It will ask if this is correct by:

PASCAL: CORRECT ?

Type 'Y'. The zero command terminates with the message

PASCAL: ZEROED.

8. You should transfer the following files to PASCAL/LIB:

FPBAS.DATA from BASICS:

INTBAS.DATA from APPLE1:

SYSTEM.APPLE from APPLE0:
SYSTEM.PASCAL
SYSTEM.MISCINFO
SYSTEM.COMPILE
SYSTEM.LIBRARY
SYSTEM.EDITOR
SYSTEM.FILER
SYSTEM.SYNTAX
SYSTEM.CHARSET from APPLE0:

CMD.CODE
NETUNIT.LIBRARY from BOOT:

SYSTEM.LINKER
SYSTEM.ASSMBLER
6500.OPCODES
6500.ERRORS from APPLE2:

APPLE0:, APPLE1:, APPLE2: and BASICS: are all diskettes distributed by Apple with the Pascal system. BOOT: is the name of the disk you originally booted from (/MAIN/PASCAL/BOOT).

File transfer is done as follows:

1. If the file to be transferred is on a 5 1/4" floppy disk, insert it in drive 1 of the controller in slot 5.
2. Type 'T' for transfer.
3. The filer will respond with:

TRANSFER WHAT FILE ?

Type in the volume name (given in the right hand column of the table above) followed by the file name (given in the left hand column of the table above). Then type <return>.

4. The filer will ask:

TO WHERE ?

Type 'PASCAL:\$'.

Do this for each file to be transferred.

3.4.2.2 Creating Bootable Pascal Disks

Using steps 1 through 7 listed above you may create as many Pascal disks as you like. Instead of transferring all the files listed in step 8, you need only the following to boot under Pascal:

SYSTEM.PASCAL
SYSTEM.MISCINFO

SYSTEM.APPLE need not be there if it can be located on the volume called /MAIN/PASCAL/LIB (or whatever default volume the BOOT program looks for).

SYSTEM LIBRARY need not be there, but Pascal has some weird behavior if you X(ecute a program which needs an intrinsic

SOFTWARE

from SYSTEM LIBRARY--it just blows up!

3.5 Minimum On-Line Disk Files

In order to boot the Nestar File System, you should use (a copy of) the disk created during the installation process. Once the NFS is operational, it is possible to remove this disk (assuming it is a floppy disk) during regular operation. You may insert any new disks after booting; be sure, however, to use the DISK CHANGE command when doing so.

There are several distributed files (or file hierarchies) which are very valuable to have on-line at all times, but none are required.

3.5.1 /MAIN/BOOT

/MAIN/BOOT (or an installation modified version thereof) should always be on-line. In principle one need not have this file on-line once all users have booted, but we suggest that it remain on-line even after all boots are completed.

3.5.2 /MAIN/SYSTEM

Similarly it is useful to have the entire /MAIN/SYSTEM sub-hierarchy on-line. There are two directories on it: the first, called /MAIN/SYSTEM/ERRORS which contains the full text of error messages, and the second, the collection of files /MAIN/SYSTEM/HELP/xxx. These are used to supply the information provided by the HELP command. The latter is easily omitted without much loss of function.

You can use the FILTRAN utility to copy some subset of the above three collections to a new volume. See Section 6.3 for details on the operation of FILTRAN.

NOTE: The system will search for these files on all units, looking for a unit-name of MAIN. The name of the disk to which you copy these Cluster Files must have the unit-name, MAIN.

Chapter 4

Software Notes4.1 Modifications to the BOOT Program

The BOOT program is a standard part of the Cluster/One Model A File Server, and provides a means for users to start up Apple DOS 3.2.1, DOS 3.3 or Apple Pascal Version 1.0 over the network. (The binary virtual diskette /MAIN/BOOT should not be confused with the Pascal virtual diskette /MAIN/PASCAL/BOOT which the Nestar File Server boots from.) BOOT is a machine language program which executes in Apple user stations, and resides in memory locations \$800 to \$11FF. For a complete description of its function and operation please see Appendix B of the User's Manual.

There are several changes which you may choose to make to the BOOT program as distributed by Nestar. Requests for changes other than those described here should be forwarded to Nestar Systems' Custom Programming Department. The procedure for making changes to the boot program is given at the end of this section. Knowledge of Apple DOS and the Apple Monitor is necessary in order to successfully complete the changes. The changes you may do yourself are as follows:

1. You can change the default prefix, for the response to 'Volume to Boot:', from /MAIN/ to some other string of up to 19 characters. We suggest you use the prefix most commonly typed in by your users. For example, if you use a directory structure similar to that shown in Section 3.3, the best prefix would probably be '/MAIN/USERS'.

Locate the address of the current default by displaying in the monitor:

*803.804

At this address is the current default string (in ASCII). In its place, insert up to 19 characters, starting with a '/', and ending with a hex 00.

2. You can cause the BOOT program to not ask the user 'Volume to Boot:', by entering the full pathname of a virtual diskette in place of the prefix described in step 1.

Locate the address of the current default prefix by displaying in the monitor:

*803.804

At this address insert the full pathname of the virtual diskette you wish to have booted at networked user stations. As with Step 1, the maximum length is 19 characters, but, terminate the pathname with a hex FF, instead of hex 00.

Note: After booting, a DOS Hello Program or Pascal SYSTEM.STARTUP program can read in the number of the station just booted by using the procedure given in Appendix D of the User's Manual.

3. You can change the default mount status when booting DOS virtual diskettes from SHR,RO to some other combination.

Locate the address of the current default by displaying in the monitor:

*805.806

At this address place the six characters you wish for the DOS default mount status, e.g. EXC,RW.

4. You can change the default mount status when booting Pascal virtual diskettes from EXC,RW to some other combination.

Locate the address of the current default by displaying in the monitor:

*807.808

At this address place the six characters you wish for the Pascal default mount status, e.g. SHR,RW.

5. You can change the name of the default Pascal volume (/MAIN/PASCAL/LIB) that contains Integer BASIC (INTBAS.DATA) and Applesoft BASIC (FPBAS.DATA), and that is automatically mounted on drive 5 for Pascal users.

Locate the address of the current default by displaying in the monitor:

*809.80A

At this address you may insert up to 38 characters (padded on the right with blanks) of the name you wish to use.

Once you have determined what changes you wish to make to

the BOOT program, follow this procedure in order to install them on your system:

```
PR#6
CALL -151 (to get to the Apple II monitor)
@BLOAD /MAIN/BOOT
```

Use the Apple II monitor to change the memory locations specified in one of the five changes listed above. Then:

```
@BSAVE temporaryname, FROM=$800, SIZE=10S
```

Now test the temporary version by issuing:

```
@BRUN temporaryname
```

Once you have ascertained that the changes work correctly, you should issue the commands:

```
@BLOAD temporaryname
@BSAVE /MAIN/BOOT:password, FROM=$800, SIZE=10S, REPLACE
```

4.2 Using DOS With More than Two Virtual Disks

DOS users may change the DOS so that it will accept disk drive numbers other than 1 and 2 (Nestor virtual disks may have numbers from 1 to 255) by POKEing the following location with the value 255.

| RAM size | location | |
|----------|----------|-------------------|
| | hex | decimal |
| 48K | \$A95B | 43355 (or -22181) |
| 32K | \$695B | 26971 |
| 16K | \$295B | 10587 |

Warning: If you use drive numbers greater than two when addressing real Apple II disk controllers, unpredictable results will occur.

4.3 Special Locations in the Network Interface Card ROM

Assembly language programs running on a station may select the Nestor Network Interface Card by executing:

```
JSR $Cn19
```

This routine has the effect of deselecting any other card using the \$C8000 address block, selecting the Nestor card, and putting \$Cn in \$07F8 (the active slot location.)

NOTES

Once the Nestar communications card is selected, the Station number may be read from location \$C800.

Chapter 5

Nestar File Server5.1 File Server Startup

System startup is extremely simple. With the disk controller(s) and network interface cards installed as described in Chapter 2 (Hardware Installation) turn on the Nestar Floppy Disk (button in the back), and the Nestar Hard Disk if present (switch by the power cord.) The hard disk has a warm-up period of about 3 minutes, before which it will not respond to disk accesses. To avoid this wait we recommend that you leave the hard disk on at all times.

If no hard disk is present, place the appropriate system diskette (for example, MAIN (Boot Version 1.0)) in either Cluster drive 1 or 2. Then turn on the Apple to run the Nestar File System by flipping the power switch on the back of the case. Nestar-provided software and firmware as described in chapter 3 (Software Installation) will boot the Apple under Pascal with the special Nestar disk (/MAIN/PASCAL/BOOT) mounted on pascal unit #4. At this time you can execute the Nestar File Server (NFS) or any one of the Nestar Disk Utilities (described in Chapter 6.)

Throughout this manual the terms 'Nestar File Server', 'NFS' and 'file server' are used for the program NFS.CODE on /MAIN/PASCAL/BOOT. The term 'Nestar File System' is used to denote NFS in connection with its support programs, ROM bootstrap, etc.

To bring up the Nestar File Server respond to the Pascal prompt line:

COMMAND: E(DIT, R(UN, F(ILE, C(OMP...

by typing 'X' (for eXecute). The system will respond with the question:

EXECUTE WHAT FILE?

Respond by typing 'NFS' followed by <return> and the file server will come up. After a short initialization (about 15 seconds) the system will prompt the console user for the current date, display status and console password (optional).

In response to the prompt:

ENTER DATE (YYMMDD):

enter the current date followed by <return>. The date is given as a sequence of six digits yyymmdd for the year, month, and day. (For instance, July 3, 1980 would be entered '800703'.) No separating characters such as / or - are used. Never enter a date prior to the current actual date. Doing so will cause the internal file system information regarding the date a Cluster File was last modified to be incorrect. Further, the file server has no actual clock; consequently the date will not be updated at midnight unless you change the date using the DATE command described in Section 5.4.2.

In response to the prompt:

CONSOLE DISPLAY ON (Y/N)?

enter either 'Y' or 'N' followed by <return>. Simply pressing <return> is equivalent to responding 'Y' to this question. This determines whether the system console will display network and console Cluster command being processed or not. (This can be changed at any time using the DISPLAY console command below.) The term 'system console' is used to denote the Apple II that is designated as the Nestar File Server.

In response to the prompt:

ENTER CONSOLE PASSWORD (OR PRESS <CR>):

enter the console password (six characters or less) that will be required in order to enter commands at the system console. If no console password is to be used, simply press <return>. The use of console passwords is discussed below.

The Nestar File Server will now complete its initialization. When you see the Nestar copyright notice reappear, the network is operational.

5.2 System Console Passwords

If no console password is given during system startup, console commands may be entered at the system console at any time as discussed in Section 5.3. This is the suggested procedure if the system console is kept in a restricted area where it is not likely to be used by unauthorized people. Alternatively, a console password may be set as described in Section 5.1. If a console password is set then it must be entered before each console command. A console password is entered by the following sequence:

- press the <esc> key
- type the exact console password
- press <carriage return>

If the password sequence is entered incorrectly, it may be restarted by pressing the <esc> key. Until a valid password is entered by the above procedure, the file server will not accept console commands and will continue to service network requests. The password being entered is not shown on the console display.

5.3 The System Console Display

During normal operation, the Nestar File Server (NFS) displays the status of the network on the bottom half of the console screen as in the following example:

NESTAR SYSTEMS CLUSTER/ONE MODEL A

| STN | ACT | TIM | INT | CHK | ADR |
|-----|-----|-----|-----|-----|-----|
| 03 | | ! | | | |
| 22 | | " | | | |
| 05 | | | | | |
| 10 | | | | | |
| 02 | CR | | | | |
| 55 | | | | | |
| CN | | | | | |

When NFS is not busy answering a network request the A in 'MODEL A' will have a blinking cursor over it. Otherwise, the cursor is elsewhere on the screen updating the network status information.

Beneath the letters STN is a list (in hexadecimal) of the numbers of the stations it has recognized. If there are more than six stations talking to the file server, then NFS tries to keep the six most recently active stations displayed. The display line whose label is CN represents stations which have just begun to transmit and whose identities are not yet known.

Next to the station numbers are five events that can occur between NFS and a station. They are:

ACT indicates which one station is currently ACTively communicating with NFS

TIM indicates that NFS received a TIME-out while talking with another station

INT indicates that NFS encountered network INTERference while connected to a station

CHK indicates that the 16-bit error CHecK failed on a network packet

ADR indicates that an ADDressing error occurred, i.e. that NFS thought it was talking to a station with a different number

Beneath the ACT heading, characters are displayed next to the station NFS is currently connected to, otherwise it is blank. NFS displays one or two characters when a connection is active. C indicates a connection has been made. The C can be followed by either a R for receiving a message or S for sending a message. For example, in the sample screen shown above, station 02 is currently connected to NFS, and NFS is receiving a message from the station.

Beneath each of the four error headings (TIM, INT, CHK, ADR) is a character indicating how many times that particular error has occurred since the last time the screen was rewritten (see RESET and CLEAR in Section 5.4.2). NFS starts with the character <space> denoting zero errors and increments it once upon each new occurrence of the error. (See the Apple II Reference Manual for a listing of the Apple character set.) For example, in the sample screen shown above, station 03 has encountered one time-out, and station 22 has had two interference errors. Upon occurrence of any of these errors, NFS will retry the transmission until the problem is remedied or the situation appears hopeless. Since error recovery procedures are automatically initiated, this part of the display is mostly for information purposes. However, continually changing characters in any of the error columns indicates that there is a problem with the network that should be investigated.

If the console display is on (see initialization above and DISPLAY in Section 5.4.2), the top half of the system console screen displays the most recently executed Cluster Command and its return code and message:

```
ss--> Cluster Command  
ss <-- rr,return message
```

The system console can also be used as a network station to monitor system activity. In general all of the Cluster Commands that are available to ordinary network stations may be entered at the system console. There is also a set of privileged commands which are only accepted at the system console.

5.4 System Console Commands

Network Commands which can be used at the system console:

All Cluster Commands (CREATE, DELETE, etc.)
except BSAVE, BLOAD, BRUN and OFF.

Privileged commands used only at the system console:

CLEAR
DISK CHANGE
DISPLAY
QUIT
RESET
SET DATE
SHOW ALL MOUNTS
SHOW ALL LOCKS
STATION

Commands are entered at the system console by simply typing them in, preceded by the console password if one was set (see Section 5.2). No prompt or cursor will appear, however, until after the first character has been typed. Then the prompt:

ENTER CMD?

will appear on the first line of the console screen, followed by the character you just typed. Finish typing in the command and follow it by <return>. The command will execute and then print the error code and error message on the screen.

It is very important to realize that during the time the file server is accepting commands being typed in at the system console, and executing those commands, the file server is not responding to any network requests. Since network requests are automatically retried for processing when the file server is not busy, none are missed, but system console commands should be used very judiciously so that they do not affect system response time.

5.4.1 Using Cluster Commands at the System Console.

All of the standard Cluster Commands (except BSAVE, BLOAD, BRUN and OFF) may be used at the system console. For instance, the console user can CREATE, MOUNT, DELETE, and PROTECT Cluster Files and directories.

5.4.2 Privileged Console Commands.

Listed on the following pages are descriptions of the privileged console commands.

CLEAR

CLEAR

-clear system console display

Parameters and Defaults

none

Error Messages

none

Access Rights Required

none

Discussion

CLEAR rewrites the system console screen and in so doing resets all the error counts (TIM, INT, CHK, and ADR).

DISK CHANGE

DISK CHANGE Uu

-allows safe removal and insertion of Nestar floppy disks

Parameters and Defaults

u: unit number indicating floppy disk to be changed (1 or 2)

Error Messages

4, ILLEGAL DRIVE NUMBER

Access Rights Required

none

Discussion

DISK CHANGE allows safe removal and insertion of floppy disks in the Nestar floppy disk drives. The file server will safely recover from the removal of floppy disks at any time, but to do so it must assume that the actual floppy in the drive has been changed. This may require the file server to UNMOUNT Cluster Files mounted on that floppy disk drive by user stations. Also, any currently outstanding SET DIRs to that floppy disk drive must be invalidated. Thus, disk removal or replacement can have unexpected effects on network users who may be using the disk in question. The DISK CHANGE console command is used to prevent these problems.

After entering the DISK CHANGE command the system responds with the message:

n FILES ARE OPEN ON DISK UNIT u
CHANGE DISK? (Y/N):

indicating how many files on the floppy disk drive in question are being used. This message is just informational; the disk may be changed even if files are open on it, but those files will no longer be accessible by their current users. The console user may respond with 'N' to abort the command. If 'Y' is typed the system prints:

INSERT NEW DISK IN DISK UNIT u
THEN PRESS <CR>

The disk may now be changed. You may enter the SHOW VOLS command in order to verify that the new disk is inserted correctly and can be read.

If DISK CHANGE is not used when inserting a new disk (not

DISK CHANGE

recommended) then you should enter a SHOW VOLs command to i.) verify the disk can be read and ii.) allow users to access the new disk by unit name rather than by unit number.

Examples

The command 'DISK CHANGE U1' would inform the Nestar File Server that you are changing the floppy disk in the leftmost Cluster drive.

DISPLAY

DISPLAY switch

-turns the console display off or on

Parameters and Defaults

switch: the keyword 'OFF' or 'ON'

Error Messages

none

Access Rights Required

none

Discussion

The top half of the console display is used to show current command activity being handled by the file server. This display is turned on by entering DISPLAY ON; and turned off by DISPLAY OFF. The initial state of the display is set during system startup as discussed above.

Note that having the console display enabled (DISPLAY ON) has an effect on system performance. In normal operation the file server will run faster if the display is off.

QUIT

QUIT

-quit the Nestar File Server

Parameters and Defaults

none

Error Messages

none

Access Rights Required

none

Discussion

QUIT commands the file server to halt operation. All of the user's disks that are currently mounted are unmounted. Hence, this command should only be used when the system is shut down. The Pascal environment is re-entered and the Nestar File Server or Nestar Disk Utilities may be executed.

RESET

RESET

-reset Nestar File Server

Parameters and Defaults

none

Error Messages

none

Access Rights Required

none

Discussion

The file server takes over the Apple reset button when it is running. Hitting <reset> at any time will cause the computer to enter the Apple monitor. Should this happen accidentally, typing the character G, followed by <carriage return> will cause the file server to resume operation; provided <reset> was not hit during a network transaction or disk access (see below). All MOUNTS, LOCKS and SET DIRs will be preserved.

The <reset> key should not generally be used. There is, however, one exceptional situation under which it may be required. If the Nestar hard disk drive, becomes not ready, use of the <reset> button as described above will restore it to operation. (You can tell if the disk is not ready by entering LIST /5 as a console command.) The RESET sequence causes the display to be re-written.

If it is necessary to use the <reset> button, care must be taken to assure that the file server is not part way through a network transaction or disk access. If this is not done, the file server's data structures may be irreparably damaged. To avoid this the you should enter a console command, BUT NOT HIT CARRIAGE RETURN, before pressing <reset>. It is suggested that the console command used be RESET. This command has no other purpose but to freeze the file server so that is not in the middle of a transaction. The <reset> button may now be used.

If the file server detects a run-time error the display will show:

```
EXEC ERROR #n
S #s, P#p, I#i
TYPE <SPACE> TO CONTINUE
```

RESET

The proper action if this happens is to record exactly the message displayed (for transmittal to Nestar Systems, Inc.), press the <reset> button, enter C600G followed by <return> to reboot the system. Then, restart the file server from the beginning (see Section 5.1). The file server's data structures are in an unknown state after a run-time error and the file server should not be allowed to continue running.

SET DATE

SET DATE yyymmdd

-sets the system date

Parameters and Defaults

yyymmdd: the date is given as a sequence of six digits yyymmdd; yy for the year, mm for the month, and dd for the day. No intervening characters such as / or - are used.

Error Messages

none

Access Rights Required

none

Discussion

Sets the system date to the value given. The system date is used to mark files with a creation date. This may be useful in conjunction with utilities such as BACKUP, described in Chapter 6. The system date is also displayed on network stations in response to the SHOW DATE command.

Never enter a date prior to the current actual date. Doing so will cause the internal file system information regarding the date a Cluster File was last modified to be incorrect. The file server has no actual clock; consequently the date will not be updated at midnight unless you change the date using this command.

Examples

If you wished to set the current date to July 3, 1980 you would enter the command 'SET DATE 800703'.

SHOW ALL

SHOW ALL item

-display all uses of the specified item over the entire network

Parameters and Defaults

item: the keyword 'MOUNTS' or 'LOCKS'

Error Messages

none

Access Rights Required

none

Discussion

This command displays the same information as SHOW MOUNTS and SHOW LOCKS but does so for the system as a whole. All current mounts or locks are displayed.

This command may cause many lines of display to be written. You can temporarily freeze the display by pressing ctrl-S once; be sure to enter ctrl-S again to unfreeze the display, and allow normal system operation to continue. If the final state of the screen is unsatisfactory the CLEAR command can be used to clean it up.

Examples

SHOW ALL MOUNTS would generate a screen similar to the one pictured below:

| NAME | DRV | ACCESS | T | VOL | SIZE | STN | USE |
|------------------|-----|--------|---|-----|------|-----|-----|
| /MAIN/PASCAL/LIB | | | | | | | |
| | 5 | RO,SHR | P | 0 | 280B | 02 | 2 |
| /MAIN/USERS/ME | | | | | | | |
| | 4 | RW,EXC | D | 32 | 455S | 41 | 1 |
| /FLOPPY/STUFF | | | | | | | |
| | 27 | RW,SHR | D | 0 | 455S | 41 | 1 |
| /MAIN/PASCAL/LIB | | | | | | | |
| | 9 | RO,SHR | P | 0 | 280B | 03 | 2 |

STATION

STATION nn

-simulate a network user station

Parameters and Defaults

nn: station number to be simulated must be between \$1 and \$7F. Number must be entered in hex preceded by a '\$'.

Error Messages

1,ILLEGAL COMMAND
5,ILLEGAL STATION NUMBER
6,STATION NUMBER MUST BE HEX (USE \$NN)

Access Rights Required

none

Discussion

The * STATION command allows the system console to simulate network requests of other network stations. This causes the system console to accept the next (one only) console command exactly as if it had been sent over the network from station nn. This command should be used very carefully, since its use may affect the operation of a user station in ways that the user does not expect. The commands BLOAD, BSAVE, BRUN, STATION and OFF cannot be simulated using the STATION command.

Attempting to use nested STATION commands generates error #1, Illegal Command.

Examples

This command is necessary if a user on station 3, for example, is running the Pascal editor and discovers that there is not enough room to write out the file being edited. The user can then go over to the system console and type

```
STATION $03
MOUNT /MAIN/EMPTYDISK,D9,RW
```

then the file could be written out to EMPTYDISK, where EMPTYDISK can be any Pascal virtual diskette on the system. Crisis solved.

Similarly it is useful for unlocking locks held by stations that have caused a deadlock, mounting a virtual diskette SHaRed rather than EXClusive, etc.

Chapter 6

Nestar Disk Utility Programs

There are four disk utilities provided with the Cluster/One Model A system. The utilities are supplied as part of the system disk 'MAIN (Boot Version 1.0)' and are located on the virtual diskette '/MAIN/PASCAL/BOOT'. They must be executed on the Apple II which acts as the Nestar File Server, and cannot be used while other file server operations are in progress. As such, these utilities are not available to normal users.

FORMAT is used to initialize new disks prior to their use in the Nestar File System. This must be done to disks as they come from the package, or a variety of disk errors will occur.

DISKCOPY is used to copy entire volumes of data between media which are of identical size. Generally it is used to provide a simple means of backing up floppy disks in their entirety.

FILTRAN is used to copy data from one disk location to another. It can copy selective portions of the data base from floppy disk to floppy disk, hard disk to floppy disk, etc. Structural changes in the Nestar File System hierarchy can be accomplished using this utility, as well as providing off-line backup capability.

FILDEBUG is a maintenance and diagnostic utility, for use by qualified Service Personnel. It is included with your system for these purposes, and is not documented in this manual.

It is essential to periodically make copies of your data base, and safely store them for possible use should a hard disk or floppy diskette become physically damaged or worn, or suffer some catastrophic loss of information. Programs and data are valuable items and should be treated as such.

FORMAT

6.1 FORMAT

All new floppy disks which are to be used with the Nestar File Server (except the disks supplied by Nestar with the original system) must be initialized by FORMAT prior to use.

FORMAT first writes special record information on each track of the disk. It then verifies that the disk is usable, by writing and reading data throughout the entire disk. During this phase errors may be reported on the console screen. A new disk should have no permanent errors; in fact, retries should not occur when verifying high quality, new disks.

FORMAT also writes special system initialization data on the disk, recording the size of the disk, its name, etc. Only when all these steps have been successfully completed can a disk be used for storage of data on the Cluster/One Model A.

If FORMAT reports errors, try removing the disk, reinserting it, and formatting it again. One of the most common problems is trying to format a disk which is write protected. Eight inch floppy disks have a notch REMOVED when they are write protected, and covered in order to write on a disk. (This, amazingly enough, is the opposite convention from that used for 5 1/4" minifloppies.) See Appendix A for a description of how to write protect floppy disks. Should the condition persist, attempt to format using the other disk drive. If disks can be formatted on one drive but not the other, the latter drive should be scheduled for service. If you can format disks, but a particular disk gives error indications, return the disk and get a replacement. Disks with permanent errors are not usable and indicate some manufacturing or handling defect.

FORMAT will accept either single-sided or double-headed floppy disks. You should use disks intended for single density, soft sectored operation. The number of sectors or sector size is immaterial, since the FORMAT program will ensure that this is made consistent with the Nestar File System requirements. The disk drives used in the Cluster/One Model A file server have two read and write heads, and will automatically utilize both sides of a floppy disk which is specified for this purpose. Do not be confused by 'flip over' disks, which are meant for drives which read and write only one side at a time, and are intended for manual flipping. These two types of disk can be visually distinguished by the number of small round holes punched near the wide slot in the disk jacket. 'Flip-over' disks have two holes punched, one on each side of the wide slot. True double-headed disks have only one hole, as do standard single-sided disks.

The optional hard disk comes is shipped to you preformatted and verified; there should never be a need to reformat it.

6.1.1 How to Run FORMAT

THE FORMAT PROGRAM WILL CAUSE ANY DATA ALREADY ON THE DISK TO BECOME INACCESIBLE, AND GIVE YOU A FRESH EMPTY DISK. BE SURE THIS IS WHAT YOU WISH TO DO BEFORE FORMATTING A DISK.

1. Boot the Nestar File System, as described in Section 5.1. From the command level, type 'X' (for X(ecute)).
2. When you are prompted:

EXECUTE WHAT FILE?

reply with 'FORMAT' (and press <return>).

3. The next prompt will be:

ENTER DRIVE NUMBER (1,2 or 5):

You must enter one of these numbers, followed by <return>. You should never reformat drive 5, the optional hard disk unit. This has been done by Nestar prior to shipping the hard disk unit to you. The drive 5 option is for use by Service Representatives only.

At this time you should enter the number '1' (for the LEFT most drive) or '2' (for the RIGHT most drive).

4. Now the system will test to see if the disk inserted in the specified drive is single or double sided, and will display:

*** THIS IS A SINGLE SIDED DISK

or

*** THIS IS A DOUBLE SIDED DISK

as the case may be.

(Should the system display THIS IS A HARD DISK you should abort the procedure immediately as described in Section 6.1.2.)

5. Next the system will prompt you with

ENTER DISK ID:

You should now type in a volume name which will be used

FORMAT

to identify this disk to the Nestar File Server, and which can be specified by users in their disk requests. This name can be up to 15 characters long. After formatting successfully, you should write the date and the name you supplied on the label of the disk. Make sure to use a felt tip pen, and never use a pencil or ball point pen. They will damage the disk medium. The date is an important item to note on the disk as well. Floppy disks will wear out in normal use. You should consult the manufacturer's specifications of the disks you are using to be sure that you periodically replace disks in use by new disks, and retire work disks in a conservative fashion. It is easy to be lulled into a sense of security due to the extensive error recovery features designed into the Cluster/One Model A system; but when a disk contains unreadable data (or cannot be written) there is absolutely nothing that can be done. You must perform regular backups using DISKCOPY and FILTRAN.

6. You are now prompted with the message:

ENTER Y TO PHYSICALLY FORMAT
THE DISK (Y/N)?

For a fresh disk you must reply with 'Y' to cause the physical formatting information to be written correctly. This will destroy any data previously recorded on this disk.

During the actual formatting process, a dot will be printed on the screen for each of the 77 tracks on the disk. Any errors will be shown on the console. Should you get a flurry of errors you can press the <esc> key to abort the entire operation at this time, and inspect the disk.

Entering 'N' in response to this prompt proceeds to the next step.

7. You are now prompted with the message:

ENTER Y TO VERIFY ALL DATA
ON THE DISK (Y/N)?

Again, for a fresh disk, you MUST verify the correctness of the formatted area of the disk, by replying 'Y'. It is possible that some errors may occur, due to problems in writing the actual physical format information during step 7. If one or two errors occur during this phase, go back and reformat the entire disk again, including step 7. This may cure the problem. In no case use a

disk which has permanent errors reported during the VERIFYING phase of this program.

You may also press <esc> while the dots are being typed for each track during verification if you need to abort and start over.

8. You are now prompted with the message:

ENTER Y TO INITIALIZE THE DISK
ROOT DIRECTORY (Y/N)?

You should now type 'Y', and FORMAT will record the name you supplied earlier for this disk, along with performing other important system initialization tasks, in the root directory for this disk. During this time the screen will display a series of dots again, following by the message:

DIRECTORY STRUCTURE INITIALIZED.

The only time you ever reply 'N' to this message is when you made a mistake earlier, and simply wish to skip to the end rapidly and then begin again. A disk which does not have correct directory information will not be usable in the Nestar File System.

Any messages other than those described above should be recorded, and if the problem persists, reported to Nestar.

NOTE: There are occasional circumstances when you have just formatted and verified a disk, and decide that you need to change the volume identification. In this case only, you may reply 'N' to both steps 6 and 7, skipping those operations, and causing only the fresh directory information to be recorded.

9. You will now be prompted with the message:

DO YOU WANT TO FORMAT
ANOTHER DISK (Y/N)?

Answering with 'Y' will re-execute the FORMAT program, allowing you to format additional floppy disks. A reply of 'N' returns you to the command level of Pascal.

6.1.2 How to Abort FORMAT

Whenever the FORMAT program requests a reply from you, you may elect to abort the current stage of formatting, and

FORMAT

start from the beginning of the program. This is done by pressing the <esc> and then <return> keys in succession.

6.2 DISKCOPY

DISKCOPY is used to make a full copy of one diskette to another already formatted diskette. It should be used periodically to preserve copies of your programs and data. Should a diskette become damaged by handling or normal wear, it may be impossible to recover the data from it, at which time a backup copy is invaluable.

DISKCOPY will copy from floppy diskette to floppy diskette; it is not used for copying data from the hard disk subsystem. DISKCOPY will copy a single-sided diskette to a single-sided diskette, or a double-headed diskette to a double-headed diskette. It will not copy between diskettes of differing capacities.

DISKCOPY will permit you to select the volume name of the target diskette you are creating. This name can be chosen to be the name previously recorded on the target, to be the name recorded on the source volume, or to be a new name that you enter from the keyboard.

DISKCOPY does not preserve any of the files which may already be present on the target diskette. They are totally replaced by an exact image copy of the entire source diskette. For a more selective form of backup and copy procedures, you should refer to the section on FILTRTAN, which provides more flexible control over copying subsections of disks, renaming Cluster Files as they are being copied, and preserving the existing files on a target diskette.

6.2.1 How to Run DISKCOPY

1. Start the Nestar File System, as described in Section 5.1. From the command level, type 'X' (for X(ecute)).
2. When you are prompted:

EXECUTE WHAT FILE?

reply with 'DISKCOPY' (and press <return>).

3. When you see the prompt:

READY DISKS IN DRIVES 1 AND 2

ENTER SOURCE DISK NUMBER:

First place the source (i.e. disk you wish to copy from) and target (i.e. disk you wish to copy to) in the two Cluster/One drives, and close the drive doors. You

DISKCOPY

should enter the number '1' if the disk you wish to copy from is in the leftmost disk drive, or '2' if it is in the righthand drive. When you see the prompt:

ENTER TARGET DISK NUMBER:

enter the drive number of the disk you wish to create by DISKCOPY.

4. At this time, the system will read the directory information from the two disks you have inserted. Several checks are made to ensure that these are valid Nester File Server disks. Once this is completed, DISKCOPY will display:

*** Source is: MASTER1
*** Size = 2464S

*** Target is: MASTER.BAK
*** Size = 2464S

(Of course the actual display will show the names of the disks you have inserted in place of MASTER1 and MASTER.BAK, and the sizes should be either 2464 for double-sided diskettes, or 1232 for single-sided diskettes.)

5. Then you see the prompt:

KEEP TARGET NAME: MASTER.BAK (Y/N)?

replying 'Y' will cause all the data from the source to be copied to the target, while preserving the name of the target disk.

If you reply 'N', you will see the prompt

KEEP SOURCE NAME: MASTER1 (Y/N)?

Replying 'Y' will cause the copy to have the same name as the original disk being copied.

If you reply 'N' again, you will see the prompt

ENTER NEW NAME (MAX. 15 CHARS)

:

to which you can supply a new name, totally different from either of the two disks you have inserted in the drives.

6. Once you have satisfactorily supplied a name as required

DISKCOPY

in Step 5, DISKCOPY will proceed to copy the entire source to target. It will keep you informed of its progress by displaying the current range of data it is copying, and the total amount to be copied.

There is nothing more for you to enter, until you see the prompt:

DO YOU WANT TO COPY
ANOTHER DISK (Y/N)?

If you wish to exit DISKCOPY, enter 'N'; otherwise to begin again enter 'Y', which will reprompt you as described above.

6.2.2 How to Abort DISKCOPY

Whenever DISKCOPY requests a reply from you, you may elect to abort the current stage of copying, and start from the beginning of the program. This is done by pressing the <esc> and the <return> keys in succession.

It is also possible to abort during the data copying phase, by pressing the <esc> key (only). If you do so, you must reinitialize the target diskette using FORMAT, or else recopy a source disk to the target using DISKCOPY successfully. The information on the target diskette is inconsistent if you exit during the copying process, and can cause a variety of unpredictable effects. Never use such a diskette without using FORMAT to enter a new empty directory, or DISKCOPY to copy a source volume to it.

6.3 FILTRAN

FILTRAN is Nestar's File Transfer Utility. It is a stand-alone utility program which runs on the file server. Its basic function is to copy files and directory structures from one physical device (the SOURCE) to another (the DESTINATION), and can be used for the following tasks:

1. Copying an entire floppy disk to a hard disk.
2. Copying part of a hard disk to a floppy disk to create a backup or to transport data to another site.
3. Copying from one floppy disk to another, even if the physical sizes differ (one-sided vs. two-sided).
4. Copying a single file or directory sub-hierarchy from one device to another.

6.3.1 Limitations

FILTRAN will currently not copy any file which is larger than the physical medium used as the destination. In particular, a large virtual PASCAL volume on the hard disk cannot be copied to a floppy disk if it is larger than about 600 sectors for a single-sided diskette, or 1200 blocks for a double-sided diskette.

6.3.2 How to Run FILTRAN

1. Boot the Nestar File System, as described in Section 5.1. From the command level, type 'X' (for X(ecute)).
2. When you are prompted:

EXECUTE WHAT FILE?

reply with 'FILTRAN' (and press <return>).

3. The first question is to be answered is what file or directory structure is to be copied:

ENTER SOURCE PATH
(USE /N FOR ENTIRE UNIT)

:

Enter the full path name, starting with the drive number or volume name, of the file or directory to be copied. For example, enter:

FILTRAN

| | |
|-----------------|---|
| /1 | to copy all of floppy disk 1 |
| /1/USER/FDR | to copy all the files in FDR's directory |
| /1/USER/FDR/DOS | to copy only the file DOS (assuming it is not itself a directory) |

FILTRAN will check the directory and determine the type of object you are trying to copy, so the disk should be ready (the diskette inserted and the door closed, in the case of a floppy disk) before you answer this question.

FILTRAN is a privileged system utility and has the ability to inhibit the normal password and access control. You will not be refused access to any file on the source, or asked to supply any passwords in any pathname. (Since FILTRAN can only be run on the file server, this does not represent a breach of security). Files created on the destination will, with the exception of implicitly created directories as noted below, have all the passwords and access rights of the original.

6.3.2.1 Copying Single Files

In the simple case where a file (rather than a directory) has been specified, you will be asked:

ENTER DESTINATION NAME

:

and you simply enter the path name that you want for the new file, again starting with the drive number or volume name. For example,

/MAIN/FDR/OLDDOS

As usual, the pathname can be a sequence of directory names, and any directories which do not yet exist will be created. If the file already exists, you will be asked:

ERASE DUPLICATE (Y/N)?

If you say 'Y', then the existing file will be deleted, and the new file created in its place. If you say 'N', then you get a chance to change disks or to respecify the name:

CREATED PATHNAME WILL BE:
/5/USERS/FDR/NEWDOS
OK (Y/N)?

If you say 'Y', then it tries again with the same name, which is useful if the destination is a floppy disk and you have changed the diskette. If you say 'N', then it asks for a new name:

ENTER NEW PATHNAME OF FILE
:

Enter a new name (on any physical volume) and FILTRAN will try again.

6.3.2.2 Copying Directory Structures

In the case where the SOURCE path specifies a directory (rather than a file), you will be asked

ENTER PREFIX FOR DESTINATION FILES
(USE "/N" FOR ROOT)
:

Enter the initial part of the pathname that you wish all of the copied directories and files to have. The pathname you specify is the name of the directory in which entries will be made for the objects at the top level of the SOURCE.

For example, suppose you have specified /1/USER as the SOURCE, and the directory structure is

```
/1/USER
  /FILE1
  /DIRECTORY
    /FILE2
    /FILE3
    /FILE4
  ...other files in /1/USER...
```

If you specify /5/USER/FDR as the DESTINATION, then the resulting file structure will be

```
/1/USER/FDR
  ...existing files in /1/USER/FDR...
  /FILE1
  /DIRECTORY
    /FILE2
    /FILE3
    /FILE4
```

FILTRAN

Note the general rule: files and directories underneath the specified SOURCE directory are copied and added to the DESTINATION directory. As usual, directories in the DESTINATION pathname may or may not already exist.

An important particular case of this general rule applies when you want to copy ALL of a physical disk and leave the directory structure intact. In that case both the SOURCE and DESTINATION specify only the root directory; for example using "/1" as the SOURCE and "/5" as the DESTINATION will copy all of floppy disk 1 into the hard disk at the top level. Any existing files or directories already at the top level will remain undisturbed, as will the name and attributes of the root directory.

After asking about the source and destination paths, FILTRAN will ask some question about how each directory or file is to be processed.

ASK ABOUT EACH FILE (Y/N)?

If you say 'Y', then each file or directory will be listed before it is copied, and you will get a chance to copy it or skip it. If you say 'N', then all files in the SOURCE structure will be copied, but in this case FILTRAN asks first how duplicate names should be handled.

ERASE DUPLICATES (Y/N)?

If you say 'Y', the a file which already exists on the DESTINATION with the same name as a file being created will be erased. If you say N, then you are asked:

SKIP DUPLICATES (Y/N)?

If you say 'Y', then any file which can't be copied because the new name already exists will be skipped.

If you say 'N' to both the ERASE DUPLICATES and SKIP DUPLICATES questions, then you will be asked about each duplicate name as it arises. If you expect no duplicates, the prudent course is to answer 'N' to both these questions.

After these initial questions, FILTRAN will proceed to search the SOURCE structure and copy files to the DESTINATION. It announces each item name and size as it is processed:

FILE: /1/USER/FILE1,SIZE=212S
or
DIRECTORY: /1/USER/DIRECTORY,SIZE=3S

If you have asked to be asked about each item, then for files FILTRAN will ask:

COPY (Y/N)?

and you respond appropriately. If you say 'Y', then it shows the name and size of the file it is about to create, and gives you a chance to change its pathname.

CREATED PATHNAME WILL BE:
/5/USERS/FDR/FILE1,SIZE=212S
OK (Y/N)?

If you say 'Y' the file is created and copied, but if you say 'N' you are asked for the new name:

ENTER NEW PATHNAME OF FILE

The file is created and you are kept informed of the blocks being copied as the transfer progresses:

COPYING 110 TO 129 OF 1200

The units are in sectors (256 bytes), and since there are N+1 sectors in the range from 0 to N, the last message will look something like

COPYING 1180 TO 1199 OF 1200

If any errors are encountered in creating the file or copying the data, the error message is reported and you are asked

OK TO SKIP IT (Y/N)?

If you say 'N', FILTRAN attempts to create and copy the file again; in the case of a floppy disk you may change the diskette before the new attempt is made. If the original attempt failed because there was not enough room on the destination disk, you will be specifically prompted about using a new diskette.

TRY AGAIN WITH NEW DISK (Y/N)?

When a directory is encountered in the source, and you wanted to be asked about each file, then you will be asked separately if you (a) want to create the directory

now, in which case it will inherit all of the passwords and access rights of the original directory, and (b) if you want the directory searched.

CREATE THIS DIRECTORY (Y/N)?

SEARCH THIS DIRECTORY (Y/N)?

The questions are independent; for instance you may choose not to create the directory but to search it, because you will rename all of the files that are copied. Conversely, you may choose to create the directory (with all the passwords and access rights copied) but not search it to copy files that it currently contains.

If you do not choose to CREATE the directory when it asks, but do search it and copy some files with their original names, then the directory will be created implicitly in the normal fashion if it does not already exist. The difference is that the password and access rights will not be copied from the SOURCE, but rather implied from the file being copied.

6.3.3 Copying Nestar File Server Bootable Disks

Virtual diskettes from which the Nestar File Server can be booted have special identification information in the header record of the disk. After FILTRAN has copied a virtual diskette which is identified as the boot virtual diskette of the source disk, it asks whether you want the newly-created copy to be the boot virtual diskette of the destination disk:

THIS IS THE BOOT PROGRAM OF THE
SOURCE DISK. SHOULD IT BE THE
BOOT PROGRAM OF THE DESTINATION (Y/N)?

If you intend to boot the system from the destination disk, you should answer 'Y'. The only reason to answer 'N' is if the destination disk already has an identified boot virtual diskette that you do not want to disturb.

6.3.4 The Simple Special Cases

The question and answer dialog that FILTRAN expects is complicated to explain because there are many variations in the general problem of copying a substructure of one directory hierarchy to another. Although an effort has been made to have it ask the relevant questions at the right place, it is important to note that there are two simple special cases which require only a few answers.

1. Copying an entire floppy disk to the hard disk or another floppy:

Specify "/1" as the SOURCE, and "/5" (or "/2") as the DESTINATION. Then answer N to the first three questions

ASK ABOUT EACH FILE (Y/N)? n
ERASE DUPLICATES (Y/N)? n
SKIP DUPLICATES (Y/N)? n

The entire disk will be copied and you will not be bothered for more responses unless something goes wrong.

2. Copy a single file from one disk to another:

Specify the full pathname of the file to be copied as the SOURCE, and the full pathname of the new file. You will be asked no other questions unless something goes wrong.

3. Copy a single file on the same disk

FILTRAN can be used to copy or duplicate files on the same physical disk by simply using the same root directory for both source and destination.

Appendix A

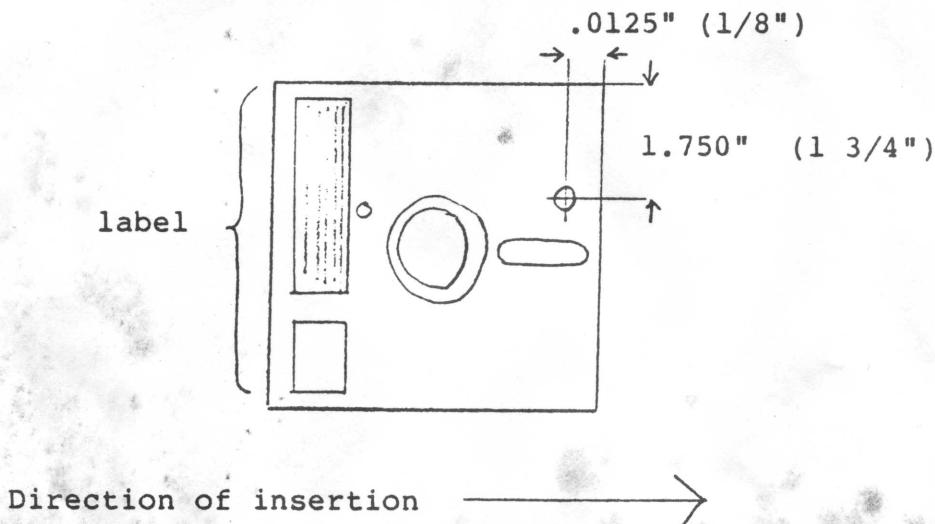
Protecting Diskettes from Erasure

You can protect all the programs on a diskette from being erased, or new ones from being added, by use of the write protect feature. A disk is write protected when the write protect notch is cut, or open. A disk without a notch, or with it covered is not protected.

NOTE: This is exactly the opposite convention from that used for 5 1/4" minidisks.

Some 8 inch diskettes come with the write protect notch already cut, in which case you need only cover or uncover the hole to modify the protection. You must use an opaque sticker when covering the hole. Make sure that the disk is not write protected when you take a fresh disk from a package and attempt to format it for use on the Cluster/One system.

If you need to cut a write protect notch, the diagram below indicates its position. First layout the center position, and then punch with a standard hand punch. Be very careful to accurately position the hole; an error could result in your not only protecting your programs, but destroying the disk inside the jacket as well.



Appendix B

Quick Reference List of Privileged Console Commands

CLEAR

-clear system console display

DISKCHANGE Uu

-allows safe removal and insertion of floppy disks in unit u

DISPLAY switch

-turns console display ON or OFF

QUIT

-quit the Nestar File Server

RESET

-reset the Nestar File Server

SET DATE yyymmdd

-sets system date to year yy, month mm, date dd

SHOW ALL item

-display all uses of MOUNTS or LOCKS over the entire network

STATION \$nn

-simulate user station with hex number nn

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